

Docket No: 243352US2-SRD DIV  
Inventor: MASAHIRO OSHIKIRI ET AL.  
Filed: HEREWITH

**Amendment to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-11. (Canceled)

Claim 12. (Original) A speech encoding method comprising the steps of:  
dividing an input speech signal into frames each having a predetermined length;  
obtaining a pitch period of a future frame with respect to a current frame to be encoded; and  
encoding the pitch period.

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Claim 13. (Original) A speech encoding method comprising the steps of:  
dividing an input speech signal into frames each having a predetermined length, and further dividing a speech signal of each frame into subframes;  
obtaining a predictive pitch period of a subframe in a current frame by using pitch periods of at least two frames of the current frame to be encoded and past and future frames with respect to the current frame; and  
obtaining a pitch period of a subframe in the current frame by using the predicted pitch period.

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Claim 14. (Original) A method according to claim 13, further comprising the step of encoding the pitch period of the subframe in the current frame.

Claim 15. (Original) A method according to claim 13, further comprising the step of preparing a pitch filter for suppressing or emphasizing a pitch period component of an input speech signal, and determining a transfer function for said pitch filter by using the pitch period of the subframe in the current frame.

Claim 16. (Original) A speech encoding method comprising the steps of:  
preparing an adaptive codebook storing a plurality of adaptive vectors generated by repeating a past excitation signal series at a period included in a predetermined range;  
dividing an input speech signal into frames each having a predetermined length, and further dividing a speech signal of each frame into subframes;  
obtaining a predicted pitch period of a subframe in a current frame by using pitch periods of at least two frames of the current frame to be encoded and past and future frames with respect to the current frame; and  
determining a search range for subframes in the current frame by using the predicted pitch period to select an adaptive vector with a period that minimizes an error between a target vector and a signal obtained by filtering an adaptive vector extracted from said adaptive codebook through a perceptually weighted synthesis filter.

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Claim 17. (Original) A method according to claim 13, wherein the step of obtaining the pitch period of the frame comprises adaptively deciding a pitch period analysis position for each frame.

Claim 18. (Original) A method according to claim 13, further comprising the step of selecting a method of obtaining a pitch period of a subframe in the current frame in accordance with continuity of pitch periods.

Claim 19. (Canceled)

Claim 20. (Original) A speech encoding apparatus comprising:  
means for dividing an input speech signal into frames each having a predetermined length;  
means for obtaining a pitch period of a future frame with respect to a current frame to be encoded; and  
means for encoding the pitch period obtained by said means for obtaining the pitch period.

Claim 21. (Original) A speech encoding apparatus comprising:  
a divider section for dividing an input speech signal into frames each having a predetermined length, and further dividing a speech signal of each frame into subframes;

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a predicted subframe pitch period calculation section for obtaining a predicted pitch period of a subframe in a current frame by using pitch periods of at least two frames of the current frame to be encoded and past and future frames with respect to the current frame; and

a subframe pitch period calculation section for obtaining a pitch period of a subframe in the current frame by using the predicted pitch period.

Claim 22. (Original) A speech encoding apparatus comprising:

an adaptive codebook storing a plurality of adaptive vectors generated by repeating a past excitation signal series at a period included in a predetermined range;

a divider section for dividing an input speech signal into frames each having a predetermined length, and further dividing a speech signal of each frame into subframes;

a predicted subframe pitch period calculation section for obtaining a predictive pitch period of a subframe in a current frame by using pitch periods of at least two frames of the current frame to be encoded and past and future frames with respect to the current frame; and

a search range determination section for determining a search range for subframes in the current frame by using the predicted pitch period to select an adaptive vector with a period that minimizes an error between a target vector and a signal obtained by filtering an adaptive vector extracted from said adaptive codebook through a perceptually weighted synthesis filter.

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Claim 23. (Original) A recording medium on which a program is recorded, said program being used to execute processing of dividing an input speech signal into frames each having a predetermined length, and obtaining a pitch period of a future frame with respect to a current frame to be encoded, and processing of encoding the pitch period.

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Claim 24. (Original) A recording medium on which a program is recorded, said program being used to execute processing of dividing an input speech signal into frames each having a predetermined length, further dividing a speech signal of each frame into subframes, and obtaining a predicted pitch period of a subframe in a current frame by using pitch periods of at least two frames of the current frame to be encoded and past and future frames with respect to the current frame, and processing of obtaining a pitch period of a subframe in the current frame by using the predicted pitch period.

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Claim 25. (Original) A computer-readable recording medium on which a program for performing speech encoding processing is recorded, the program being used to execute processing of dividing an input speech signal into frames each having a predetermined length, further dividing a speech signal of each frame into subframes, and obtaining a predicted pitch period of a subframe in a current frame by using pitch periods of at least two frames of the current frame to be encoded and past and future frames with respect to the current frame, and processing of determining a search range for subframes in the current frame by using the predicted pitch period to select an adaptive vector with a period that minimizes an error between a target vector and a signal obtained by filtering an adaptive vector extracted from

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an adaptive codebook through a perceptually weighted synthesis filter, said adaptive  
codebook storing a plurality of adaptive vectors generated by repeating a past excitation  
signal series at a period included in a predetermined range.